



NSAI
Standards

Irish Standard
I.S. EN IEC 60352-7:2021

Solderless connections - Part 7: Spring clamp connections - General requirements, test methods and practical guidance

I.S. EN IEC 60352-7:2021

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN IEC 60352-7:2021

Published:

2021-02-05

This document was published under the authority of the NSAI and comes into effect on:

2021-02-22

ICS number:

31.220.10

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN IEC 60352-7:2021 is the adopted Irish version of the European Document EN IEC 60352-7:2021, Solderless connections - Part 7: Spring clamp connections - General requirements, test methods and practical guidance

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN IEC 60352-7

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2021

ICS 31.220.10

Supersedes EN 60352-7:2002 and all of its amendments
and corrigenda (if any)

English Version

**Solderless connections - Part 7: Spring clamp connections -
General requirements, test methods and practical guidance
(IEC 60352-7:2020)**

Connexions sans soudures - Partie 7: Connexions à ressort -
Règles générales, méthodes d'essai et guide pratique
(IEC 60352-7:2020)

Lötfreie Verbindungen - Teil 7: Federklemmverbindungen -
Allgemeine Anforderungen, Prüfverfahren und
Anwendungshinweise
(IEC 60352-7:2020)

This European Standard was approved by CENELEC on 2021-01-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60352-7:2021 (E)

European foreword

The text of document 48B/2823/CDV, future edition 2 of IEC 60352-7, prepared by SC 48B "Electrical connectors" of IEC/TC 48 "Electrical connectors and mechanical structures for electrical and electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60352-7:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2021-10-20 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2024-01-20 document have to be withdrawn

This document supersedes EN 60352-7:2002 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60352-7:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60512-1-100	NOTE	Harmonized as EN 60512-1-100
IEC 60512-9-5	NOTE	Harmonized as EN IEC 60512-9-5
IEC 60947-7-1:2009	NOTE	Harmonized as EN 60947-7-1:2009 (not modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60189-3	2007	Low-frequency cables and wires with PVC insulation and PVC sheath - Part 3: Equipment wires with solid or stranded conductor wires, PVC insulated, in singles, pairs and triples	-	-
IEC 60228	2004	Conductors of insulated cables	EN 60228	2005
-	-		+ corrigendum May	2005
IEC 60512-1	-	Connectors for electrical and electronic equipment - Tests and measurements - Part 1: Generic specification	EN IEC 60512-1	-
IEC 60512-1-1	-	Connectors for electronic equipment - Tests and measurements - Part 1-1: General examination - Test 1a: Visual examination	EN 60512-1-1	-
IEC 60512-1-2	-	Connectors for electronic equipment - Tests and measurements - Part 1-2: General examination - Test 1b: Examination of dimension and mass	EN 60512-1-2	-
IEC 60512-2-1	-	Connectors for electronic equipment - Tests and measurements - Part 2-1: Electrical continuity and contact resistance tests - Test 2a: Contact resistance - Millivolt level method	EN 60512-2-1	-
IEC 60512-2-2	-	Connectors for electronic equipment - Tests and measurements - Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance - Specified test current method	EN 60512-2-2	-

EN IEC 60352-7:2021 (E)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60512-2-5	-	Connectors for electronic equipment - Tests and measurements - Part 2-5: Electrical continuity and contact resistance tests - Test 2e: Contact disturbance	EN 60512-2-5	-
IEC 60512-6-4	-	Connectors for electronic equipment - Tests and measurements - Part 6-4: Dynamic stress tests - Test 6d: Vibration (sinusoidal)	EN 60512-6-4	-
IEC 60512-9-2	-	Connectors for electronic equipment - Tests and measurements - Part 9-2: Endurance tests - Test 9b: Electrical load and temperature	EN 60512-9-2	-
IEC 60512-11-1	-	Connectors for electrical and electronic equipment - Tests and measurements - Part 11-1: Climatic tests - Test 11a - Climatic sequence	EN IEC 60512-11-1	-
IEC 60512-11-4	-	Connectors for electronic equipment - Tests and measurements - Part 11-4: Climatic tests - Test 11d: Rapid change of temperature	EN 60512-11-4	-
IEC 60512-11-7	-	Connectors for electronic equipment - Tests and measurements - Part 11-7: Climatic tests - Test 11g: Flowing mixed gas corrosion test	EN 60512-11-7	-
IEC 60512-16-20	-	Electromechanical components for electronic equipment - Basic testing procedures and measuring methods - Part 16: Mechanical tests on contacts and terminations - Section 20: Test 16t: Mechanical strength (wired termination of solderless connections)	EN 60512-16-20	-



IEC 60352-7

Edition 2.0 2020-12

INTERNATIONAL STANDARD

**Solderless connections –
Part 7: Spring clamp connections – General requirements, test methods and
practical guidance**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.



IEC 60352-7

Edition 2.0 2020-12

INTERNATIONAL STANDARD

**Solderless connections –
Part 7: Spring clamp connections – General requirements, test methods and
practical guidance**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.220.10

ISBN 978-2-8322-9181-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Requirements	10
4.1 Workmanship	10
4.2 Tools	10
5 Pre-requisites for basic test schedule	10
5.1 Spring clamp terminations	10
5.1.1 Materials	10
5.1.2 Surface finishes	11
5.1.3 Design features	11
5.1.4 Dimensions	11
5.2 Wires	11
5.2.1 General	11
5.2.2 Materials	11
5.2.3 Dimensions	11
5.2.4 Surface finishes	11
5.2.5 Wire insulation	12
5.3 Spring clamp connections	12
6 Testing	12
6.1 General	12
6.2 Standard conditions for testing	12
6.3 Preconditioning	12
6.4 Recovery	12
6.5 Mounting of specimen	12
7 Tests	13
7.1 General examination	13
7.2 Mechanical tests	13
7.2.1 Tensile strength	13
7.2.2 Wire deflection	13
7.2.3 Vibration	16
7.2.4 Repeated connections and disconnections	17
7.3 Electrical tests	18
7.3.1 Contact resistance	18
7.3.2 Electrical load and temperature	19
7.4 Climatic tests	19
7.4.1 General	19
7.4.2 Rapid change of temperature	19
7.4.3 Climatic sequence	19
7.4.4 Flowing mixed gas corrosion test	20
8 Test schedules	20
8.1 General	20
8.2 Basic test schedule	21

8.2.1	General	21
8.2.2	Initial examination.....	21
8.2.3	Testing of spring clamp connections with spring clamp terminations with and without a specified wire range	21
8.3	Full test schedule.....	22
8.3.1	General	22
8.3.2	Initial examination.....	22
8.3.3	Testing of spring clamp connections with and without a specified wire range	22
8.4	Flow charts	23
Annex A (informative)	Practical guidance.....	26
A.1	Current-carrying capacity	26
A.2	Tool information.....	26
A.3	Termination information	26
A.3.1	General	26
A.3.2	Design features	26
A.3.3	Materials	27
A.3.4	Surface finishes.....	27
A.4	Wire information.....	27
A.4.1	General	27
A.4.2	Materials	28
A.4.3	Surface finishes.....	28
A.4.4	Stripping information.....	28
A.5	Connection information	29
Bibliography	30
Figure 1	– Examples of spring clamp connections.....	9
Figure 2	– Example of a spring clamp terminal.....	10
Figure 3	– Information for the wire deflection test.....	16
Figure 4	– Test arrangement, vibration	17
Figure 5	– Test arrangement, current method	18
Figure 6	– Basic test schedule (see 8.2)	24
Figure 7	– Full test schedule (see 8.3).....	25
Figure A.1	– Correctly stripped wire	28
Figure A.2	– Examples of stripping faults	29
Table 1	– Values of tensile strength	13
Table 2	– Value of force for wire deflection test	15
Table 3	– Vibration, test severities	17
Table 4	– Rated current of the wires, initial and final contact resistance.....	19
Table 5	– Number of specimens required	21
Table 6	– Test group P1	21
Table 7	– Test group P2	22
Table 8	– Test group A	22
Table 9	– Test group B	23
Table 10	– Test group C	23
Table 11	– Test group D	23

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SOLDERLESS CONNECTIONS –**Part 7: Spring clamp connections – General requirements,
test methods and practical guidance**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60352-7 has been prepared by subcommittee SC 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This second edition cancels and replaces the first edition of IEC 60352-7, published in 2002. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) correction of the two flow charts in Figure 6 and Figure 7,
- b) split the content into more clauses for better separation between full test schedule and basic test schedule,
- c) relocating the content of former Clause 6 Practical guidance into an informative Annex A, as now common in the IEC 60352 series for solderless connections,

d) clarification on conductor types with reference to classes defined in IEC 60228.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
48B/2823/CDV	48B/2851/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

This document was drafted in accordance with ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60352 series, published under the general title *Solderless connections*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 60352 covers spring clamp connections and includes requirements, tests and practical guidance information.

Two test schedules are provided.

- a) The basic test schedule applies to spring clamp connections which conform to all requirements of Clause 5. These requirements are derived from experience with successful applications of such spring clamp connections.
- b) The full test schedule applies to spring clamp connections which do not fully conform to all requirements of Clause 5, for example which are manufactured using materials or finishes not included in Clause 5.

This approach permits cost and time effective performance verification using a limited basic test schedule for established spring clamp connections and an expanded full test schedule for spring clamp connections requiring more extensive performance validation.

The values given in this document are minimum values, which are harmonized with other IEC documents. Other standards may specify other values.

SOLDERLESS CONNECTIONS –

Part 7: Spring clamp connections – General requirements, test methods and practical guidance

1 Scope

This part of IEC 60352 is applicable to spring clamp connections made with stripped wire without further preparation:

- solid conductors of 0,32 mm to 3,7 mm nominal diameter (0,08 mm² to 10 mm² cross-section), or
- stranded conductors of 0,08 mm² to 10 mm² cross-section, or
- flexible conductors of 0,08 mm² to 10 mm² cross-section,

according to IEC 60228 or IEC 60189-3 for use in electrical and electronic equipment and components.

Information on materials and data from industrial experience is included in addition to the test procedures to provide electrically stable connections under prescribed environmental conditions.

The object of this document is to determine the suitability of spring clamp connections under specified mechanical, electrical and atmospheric conditions.

NOTE IEC Guide 109 advocates the need to minimize the impact of a product on the natural environment throughout the product life cycle. It is understood that some of the materials permitted in this document can have a negative environmental impact. As technological advances lead to acceptable alternatives for these materials, they will be eliminated from this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60189-3:2007, *Low-frequency cables and wires with PVC insulation and PVC sheath – Part 3: Equipment wires with solid or stranded conductor wires, PVC insulated, in singles, pairs and triples*

IEC 60228:2004, *Conductors of insulated cables*

IEC 60512-1, *Connectors for electrical and electronic equipment – Tests and measurements – Part 1: Generic specification*

IEC 60512-1-1, *Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination*

IEC 60512-1-2, *Connectors for electronic equipment – Tests and measurements – Part 1-2: General examination – Test 1b: Examination of dimension and mass*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-